

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference CDT091 PCT	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/GB00/01991	International filing date (day/month/year) 01/06/2000	Priority date (day/month/year) 09/06/1999
International Patent Classification (IPC) or national classification and IPC H01L51/20		
Applicant CAMBRIDGE DISPLAY TECHNOLOGY LIMITED et al.		



1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 6 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

 These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 22/12/2000	Date of completion of this report 17.09.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Bernabé Prieto, A Telephone No. +49 89 2399 2224 

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB00/01991

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, pages:

1-21 as originally filed

Claims, No.:

1-26 as originally filed

Drawings, sheets:

1/5-5/5 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB00/01991

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-25
	No:	Claims	26
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-26
Industrial applicability (IA)	Yes:	Claims	1-26
	No:	Claims	

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB00/01991

The comments relate to items I to VIII of the cover sheet, where the corresponding cases have been crossed.

1 Reference is made to the following documents:

D1: EP-A-0 880 303

D2: EP-A-0 734 078

D3: US-A-5 201 268

2 The present application does not meet the requirements of Article 6 PCT, because claims 1, 12, 18 and 26 are not clear and claims 5 and 6 not concise.

2.1 The device of claim 26 is defined in terms of the process to produce it, rather than by means of its technical features. The intended limitations are therefore not clear from this claim, contrary to the requirements of Article 6 PCT, since it cannot be seen how the process leading to the product defined by it, leaves any recognisable distinguishing feature with respect the prior art devices at all.

2.2 Claim 18 (cf. line 2) makes reference to the "discrete pixel electrodes" of claim 12, though not yet defined therein. Furthermore, it is not clear that the first and second (and third) electroluminescent materials are different.

2.3 Since an oxygen-based plasma etching process is also a plasma etching process, claim 6 is redundant with claim 5, thus resulting in a lack of conciseness of these claims (Article 6 PCT).

2.4 The subject-matter of claim 1 is unduly broad, since it only discloses a method for forming a patterned layer. It is clear from the description (cf. page 1), however, that the application concerns a method for producing an organic light-emissive device (OLED). This broadening of the subject-matter of claim 1 with respect to the content of the application as a whole leads to an inconsistency between the claims and the description which results in a lack of clarity of the claims. Furthermore, in claims 1 and 12 it is not clear that the light-emissive material is an

organic electroluminescent material.

- 3 The present application does not comply with Article 33(2) PCT because the subject-matter of claim 26, understood only as the final optoelectronic device, is not new in view of the disclosure of document D2 (cf. Figure 5 and associated text; cf. claim 1).
- 4 The present application does not comply with Article 33(3) PCT because the subject-matter of claims 1 and 12 does not involve an inventive step.
The subject-matter of claim 12 only differs from the disclosure of document D1 (cf. Figure 3 and associated text, in particular item 308 and page 9, lines 9-11) in that the material applied to and displaced across the holed layer (as implicitly derived from the use of the techniques disclosed for the formation of layer 308 and the result shown in Figure 3) is a light emissive material, instead of a charge transfer material, which constitutes only a straightforward design option for the skilled person.
In substance for the same reasons the subject-matter of claim 1 is not inventive either.
- 5 The present application does not comply with Article 33(3) PCT because the subject-matter of claim 12, and thus of claim 1, does not involve an inventive step in view of a use of the teaching of document D3 (cf. Figure 1 and associated text) in the process disclosed in D2 (cf. Figure 5 and associated text). Indeed, the subject-matter of claim 12 only differs from the disclosure of D2 (cf. Figure 5 and associated text) in that the deposition of the EL-medium inside the cavity structure is performed by extending the EL-material in liquid form in the holes. This difference, however, constitutes only a straightforward depositing option for the skilled person. Furthermore, the skilled person always considering any alternative subprocess and aware of the disclosure of document D3 (cf. Figure 1 and associated text), would immediately consider to use the type of deposition disclosed in D3 in the method of D2. Hence, the subject-matter of claims 1 and 12 does not involve an inventive step.

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/GB00/01991

- 6 Claims 2-11 and 13-25 do not contain any additional feature which, in combination with the features to any claim to which they refer, involve an inventive step (Article 33(3), Rule 65(1),(2) PCT), since the holed layer formation methods and type are per-se well known and their use an obvious choice for the skilled person. Furthermore, to substantially repeat the procedure of claim 1 to form the other pixels (second and third light emissive materials) to complete the OLED is also per se evident to the skilled person.
- 7 The following deficiencies should also be noted:
- 7.1 Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents D1-D3 is not mentioned in the description, nor are these documents identified therein.
- 7.2 Independent claim 1 is not in the two-part form in accordance with Rule 6.3(b) PCT, which in the present case would be appropriate, with those features known in combination from the prior art being placed in a preamble (Rule 6.3(b)(i) PCT) and with the remaining features being included in a characterising part (Rule 6.3(b)(ii) PCT).
- 7.3 The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner
 US Department of Commerce
 United States Patent and Trademark
 Office, PCT
 2011 South Clark Place Room
 CP2/5C24
 Arlington, VA 22202
 ETATS-UNIS D'AMERIQUE
 in its capacity as elected Office

Date of mailing (day/month/year) 20 February 2001 (20.02.01)	
International application No. PCT/GB00/01991	Applicant's or agent's file reference CDT091 PCT
International filing date (day/month/year) 01 June 2000 (01.06.00)	Priority date (day/month/year) 09 June 1999 (09.06.99)
Applicant BERGER, Paul, Raymond et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:

22 December 2000 (22.12.00)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was
☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

<p>The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland</p> <p>Facsimile No.: (41-22) 740.14.35</p>	<p>Authorized officer</p> <p>S. Mafla</p> <p>Telephone No.: (41-22) 338.83.38</p>
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PATENT COOPERATION TREATY

PCT

REC'D 19 SEP 2001

WIPO PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference CDT091 PCT	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
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Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Bernabé Prieto, A Telephone No. +49 89 2399 2224 

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Claims, No.:

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International application No. PCT/GB00/01991

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V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims 1-25
	No: Claims 26
Inventive step (IS)	Yes: Claims
	No: Claims 1-26
Industrial applicability (IA)	Yes: Claims 1-26
	No: Claims

2. Citations and explanations
see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:
see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:
see separate sheet

**INTERNATIONAL PRELIMINARY
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International application No. PCT/GB00/01991

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2.1 The device of claim 26 is defined in terms of the process to produce it, rather than by means of its technical features. The intended limitations are therefore not clear from this claim, contrary to the requirements of Article 6 PCT, since it cannot be seen how the process leading to the product defined by it, leaves any recognisable distinguishing feature with respect to the prior art devices at all.

2.2 Claim 18 (cf. line 2) makes reference to the "discrete pixel electrodes" of claim 12, though not yet defined therein. Furthermore, it is not clear that the first and second (and third) electroluminescent materials are different.

2.3 Since an oxygen-based plasma etching process is also a plasma etching process, claim 6 is redundant with claim 5, thus resulting in a lack of conciseness of these claims (Article 6 PCT).

2.4 The subject-matter of claim 1 is unduly broad, since it only discloses a method for forming a patterned layer. It is clear from the description (cf. page 1), however, that the application concerns a method for producing an organic light-emissive device (OLED). This broadening of the subject-matter of claim 1 with respect to the content of the application as a whole leads to an inconsistency between the claims and the description which results in a lack of clarity of the claims. Furthermore, in claims 1 and 12 it is not clear that the light-emissive material is an

organic electroluminescent material.

- 3 The present application does not comply with Article 33(2) PCT because the subject-matter of claim 26, understood only as the final optoelectronic device, is not new in view of the disclosure of document D2 (cf. Figure 5 and associated text; cf. claim 1).
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In substance for the same reasons the subject-matter of claim 1 is not inventive either.
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- 6 Claims 2-11 and 13-25 do not contain any additional feature which, in combination with the features to any claim to which they refer, involve an inventive step (Article 33(3), Rule 65(1),(2) PCT), since the holed layer formation methods and type are per-se well known and their use an obvious choice for the skilled person. Furthermore, to substantially repeat the procedure of claim 1 to form the other pixels (second and third light emissive materials) to complete the OLED is also per se evident to the skilled person.
- 7 The following deficiencies should also be noted:
- 7.1 Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents D1-D3 is not mentioned in the description, nor are these documents identified therein.
- 7.2 Independent claim 1 is not in the two-part form in accordance with Rule 6.3(b) PCT, which in the present case would be appropriate, with those features known in combination from the prior art being placed in a preamble (Rule 6.3(b)(i) PCT) and with the remaining features being included in a characterising part (Rule 6.3(b)(ii) PCT).
- 7.3 The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 00/01991

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H01L51/20

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H01L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, INSPEC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 734 078 A (MOTOROLA INC) 25 September 1996 (1996-09-25) figures 1-6 column 2, line 43 -column 3, line 16 column 3, line 35 -column 7, line 55	1,3-6,9, 12,14-26
A	---	2,7,8, 10,11
	-/--	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

28 July 2000

Date of mailing of the international search report

04/08/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Polesello, P

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 00/01991

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 99 12395 A (SEKI SHUNICHI ;KIGUCHI HIROSHI (JP); SEIKO EPSON CORP (JP)) 11 March 1999 (1999-03-11) figure 1	1,2,9, 12,13, 16, 22-24,26
A		3-8,10, 11,14, 15,17-21
P,X	-& EP 0 982 974 A (SEIKO EPSON CORP) 1 March 2000 (2000-03-01) figure 1 paragraphs '0019!', '0035!', '0036!', '0038!', '0039!', '0046! tables 14-18	1,2,9, 12,13, 16, 22-24,26
P,A		3-8,10, 11,14, 15, 17-21,25
X	EP 0 880 303 A (SEIKO EPSON CORP) 25 November 1998 (1998-11-25) figures 1-4 page 4, line 8 -page 5, line 39 page 8, line 27 -page 9, line 37	1,2,9, 12,13, 16, 22-24,26
A		3-8,10, 11,14,15
A	US 5 340 619 A (CHEN YIH-WEN ET AL) 23 August 1994 (1994-08-23) figures 1,3 column 4, line 9 - line 41 column 5, line 43 -column 6, line 25 examples 1-3,5	1,3,4, 7-9,12, 14-21,26
A	US 5 201 268 A (TSUKAMOTO MASAhide ET AL) 13 April 1993 (1993-04-13) figures 1,4-6 column 2, line 55 -column 3, line 15 column 3, line 48 - line 64 column 4, line 39 -column 5, line 16	1,12
A	PATENT ABSTRACTS OF JAPAN vol. 002, no. 148 (C-030), 9 December 1978 (1978-12-09) -& JP 53 113730 A (TOSHIBA CORP), 4 October 1978 (1978-10-04) abstract	3-6,9,10

INTERNATIONAL SEARCH REPORT

information on patent family members

International Application No

PCT/GB 00/01991

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0734078	A	25-09-1996	US 5693962 A CN 1136713 A JP 8264828 A	02-12-1997 27-11-1996 11-10-1996
WO 9912395	A	11-03-1999	EP 0982974 A JP 2000106278 A	01-03-2000 11-04-2000
EP 0880303	A	25-11-1998	JP 10153967 A CN 1212114 A WO 9824271 A	09-06-1998 24-03-1999 04-06-1998
US 5340619	A	23-08-1994	NONE	
US 5201268	A	13-04-1993	JP 4240792 A JP 4221674 A	28-08-1992 12-08-1992
JP 53113730	A	04-10-1978	NONE	

INTERNATIONAL COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference CDT091 PCT	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/GB 00/ 01991	International filing date (day/month/year) 01/06/2000	(Earliest) Priority Date (day/month/year) 09/06/1999
Applicant CAMBRIDGE DISPLAY TECHNOLOGY LIMITED et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of Invention is lacking** (see Box II).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

1C

☐ None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 00/01991

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H01L51/20

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H01L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, INSPEC

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- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
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Date of the actual completion of the international search

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